

## PATENT ABSTRACTS OF JAPAN

(11)Publication number : 07-043042

(43)Date of publication of application : 10.02.1995

(51)Int.Cl. F25B 29/00  
F24F 11/02  
F25B 13/00  
F25B 13/00

(21)Application number : 05-319209

(71)Applicant : MITSUBISHI HEAVY IND LTD

(22)Date of filing : 26.11.1993

(72)Inventor : KOBAYASHI TAKAYUKI  
ITO MASAMI  
HONMA KAZUMI

(30)Priority

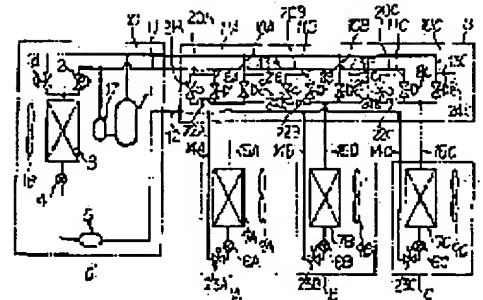
Priority number : 05148331 Priority date : 28.05.1993 Priority country : JP

## (54) AIR CONDITIONER

(57)Abstract:

PURPOSE: To prevent the cooling capacity of indoor units operating in a cooling mode from decreasing when a unit operating in a heating mode is stopped the cooling and heating simultaneous operation of the system.

CONSTITUTION: First solenoid valves 21A, 21B, 21C and capillary tubes 22A, 22B, 22C are respectively provided in bypass tubes 20A, 20B, 20C connected in parallel with indoor side switching units 8A, 8B, 8C provided in branch suction tubes 11A, 11B, 11C for connecting indoor side heat exchangers 7A, 7B, 7C to a suction tube 11, and second solenoid valves 23A, 23B, 23C are respectively provided on liquid sides of indoor side throttle mechanisms 6A, 6B, 6C. The valves 21A, 21B, 21C are opened in a heating stop mode at the time of cooling and heating simultaneous operation and the valves 23A, 23B, 23C are simultaneously closed.



## LEGAL STATUS

[Date of request for examination]

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the  
examiner's decision of rejection or application  
converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of  
rejection]

[Date of requesting appeal against examiner's decision  
of rejection]

[Date of extinction of right]

Copyright (C); 1998,2003 Japan Patent Office

# \* NOTICES \*

JPO and NCIP are not responsible for any damages caused by the use of this translation.

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

## CLAIMS

### [Claim(s)]

[Claim 1] A compressor, the discharge tube connected to the discharge side of this compressor, and the suction pipe connected to the above-mentioned compressor's intake side, An outdoor side heat exchanger and the outdoor side change-over valve which makes the above-mentioned discharge tube or the above-mentioned suction pipe open alternatively the gas side of the above-mentioned outdoor side heat exchanger for free passage, The outdoor side diaphragm device arranged in the liquid side of the above-mentioned outdoor side heat exchanger, and two or more interior-of-a-room side heat exchangers, The interior-of-a-room side change-over valve which makes the above-mentioned discharge tube or the above-mentioned suction pipe open alternative the gas side of two or more above-mentioned interior-of-a-room side heat exchangers for free passage, respectively, The interior-of-a-room side diaphragm device arranged in the liquid side of two or more above-mentioned interior-of-a-room side heat exchangers, respectively, Have liquid cooling intermediation piping which connects the liquid side of two or more above-mentioned interior-of-a-room side diaphragm devices the liquid side of the above-mentioned outdoor side diaphragm device, and it sets to air conditioning operation, heating operation, and the air conditioner that can carry out the cold and heating parallel running. While preparing the 1st solenoid valve and capillary tube in the by-path pipe connected to juxtaposition to the interior-of-a-room side change-over valve infixed in the branching suction pipe which connects the above-mentioned interior-of-a-room side heat exchanger and the above-mentioned suction pipe, the 2nd solenoid valve is formed in the liquid side of the above-mentioned interior-of-a-room side diaphragm device. And the air conditioner characterized by establishing the control means which makes the 1st solenoid valve of the above open, and makes the 2nd solenoid valve of the above close by the heating stop mode at the time of the cold and heating parallel running.

[Claim 2] A compressor, the discharge tube connected to the discharge side of this compressor, and the suction pipe connected to the above-mentioned compressor's intake side, An outdoor side heat exchanger and the outdoor side change-over valve which makes the above-mentioned discharge tube or the above-mentioned suction pipe open alternatively the gas side of the above-mentioned outdoor side heat exchanger for free passage, The outdoor side diaphragm device arranged in the liquid side of the above-mentioned outdoor side heat exchanger, and two or more interior-of-a-room side heat exchangers, The interior-of-a-room side change-over valve which makes the above-mentioned discharge tube or the above-mentioned suction pipe open alternative the gas side of two or more above-mentioned interior-of-a-room side heat exchangers for free passage, respectively, The interior-of-a-room side diaphragm device arranged in the liquid side of two or more above-mentioned interior-of-a-room side heat exchangers, respectively, Have liquid cooling intermediation piping which connects the liquid side of two or more above-mentioned interior-of-a-room side diaphragm devices the liquid side of the above-mentioned outdoor side diaphragm device, and it sets to air conditioning operation, heating operation, and the air conditioner that can carry out the cold and heating parallel running. While forming the 2nd solenoid valve in the liquid side of the above-mentioned interior-of-a-room side diaphragm device, the 1st solenoid valve and capillary tube are prepared in the bypass circuit which connects the above-mentioned suction pipe between this 2nd solenoid valve and the above-mentioned interior-of-a-room side diaphragm devices. And the air conditioner characterized by establishing the control means which makes the 1st solenoid valve of the above open, and makes the 2nd solenoid valve of the above close by the heating stop mode at the time of the cold and heating parallel running.

---

[Translation done.]

\* NOTICES \*

JPO and NCIP are not responsible for any damages caused by the use of this translation.

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

---

DETAILED DESCRIPTION

---

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention is equipped with two or more sets of one set of an outdoor unit, and indoor units, and relates to the air conditioner which can carry out heating air conditioning operation and operation, and the cold and heating parallel running.

[0002]

[Description of the Prior Art] One example of this conventional seed air conditioner is shown in drawing 2. In drawing 2, 1 is a compressor, 10 is a discharge tube, and it connects with the discharge side of a compressor 1. 11 is a suction pipe and is connected to the inlet side of a compressor 1. 3 is an outdoor side heat exchanger and the gas side is alternatively connected to a discharge tube 10 or a suction pipe 11 through the outdoor side change-over valves 18 and 2.

[0003] 7A, 7B, and 7C are interior-of-a-room side heat exchangers, and the gas side is branching discharge-tube 10A, and 10B and 10C, respectively. Infix interior-of-a-room side change-over valve 13A, 13B, and 13C It minds or they are the branching suction pipes 11A and 11B and 11C. It connects with a discharge tube 10 or a suction pipe 11 alternatively through the infix interior-of-a-room side change-over valves 8A, 8B, and 8C.

[0004] 4 is an outdoor side diaphragm device and is arranged in the liquid side of the outdoor side heat exchanger 3. 6A, 6B, and 6C are interior-of-a-room side diaphragm devices, and are arranged in the liquid side of the interior-of-a-room side heat exchangers 7A, 7B, and 7C, respectively. 12 is liquid cooling intermediation piping and has connected the liquid side of two or more interior-of-a-room side diaphragm devices 6A, 6B, and 6C the liquid side of the outdoor side diaphragm device 4.

[0005] 16 is an outdoor side blower and is made to \*\*\*\* the open air to the outdoor side heat exchanger 3. 9A, 9B, and 9C are interior-of-a-room side blowers, and are made to \*\*\*\* indoor air to the interior-of-a-room side heat exchangers 7A, 7B, and 7C. 5 is a receiver and is infix in the liquid cooling intermediation piping 12. 17 is an accumulator and is infix in the inlet side of a compressor 1.

[0006] O is an outdoor unit and a compressor 1, the outdoor side change-over valves 18 and 2, the outdoor side heat exchanger 3, the outdoor side blower 16, the outdoor side diaphragm device 4, the receiver 5, and the accumulator 17 grade are built in in this.

[0007] A, B, and C are indoor units, respectively, interior-of-a-room side heat exchanger 7A, interior-of-a-room side diaphragm device 6A, and interior-of-a-room side blower 9A are built in indoor unit A, interior-of-a-room side heat exchanger 7B, interior-of-a-room side diaphragm device 6B, and interior-of-a-room side blower 9B are built in indoor unit B, and interior-of-a-room side heat exchanger 7C, interior-of-a-room side diaphragm device 6C, and interior-of-a-room side blower 9C are built in indoor unit C.

[0008] S is a branching unit and is branching discharge-tube 10A, 10B, 10C, and branching suction-pipe 11A, 11B, 11C, and interior-of-a-room side change-over valve 13A, 13B, and 13C in this. And 8A, 8B, and 8C are built in.

[0009] For outdoor unit O and the branching unit S, it connects mutually through a discharge tube 10, a suction pipe 11, and the liquid cooling intermediation piping 12, and two or more sets of the branching unit S and indoor units A, B, and C are connection refrigerant piping 14A, 14B, 14C, 15A, 15B, and 15C. It minds and connects.

[0010] And outdoor unit O and indoor units A, B, and C are connected through a control signal line. Moreover, the branching unit S and indoor units A, B, and C are connected through a control signal line. It responds to the operation mode and the load of each indoor units A, B, and C which are transmitted through these control signal line. The outdoor side change-over valves 2 and 18, interior-of-a-room side change-over valve 8A, 8B, 8C, 13A, 13B, 13C, the outdoor side diaphragm device 4, and the interior-of-a-room side diaphragm devices 6A, 6B, and 6C are opened and closed, and the airflow of the outdoor side blower 16 and the interior-of-a-room side blowers 9A, 9B, and 9C is adjusted.

[0011] When air conditioning operation of all or some of indoor units A, B, and C is carried out, indoor units A and B are made into the opening as which the outdoor side diaphragm device 4 was considered as full open when air conditioning operation and indoor unit C were stopped, and the interior-of-a-room side diaphragm devices 6A and 6B were determined beforehand, and let interior-of-a-room side diaphragm device 6C be a close by-pass bulb completely. And the outdoor side change-over valve 18 opens the outdoor side heat exchanger 3 for free passage to a discharge tube 10, open and the outdoor side change-over valve 2 being used as close. The interior-of-a-room side change-over valves 8A and 8B are open and interior-of-a-room side change-over valve 13A and 13B. Considering as close, the interior-of-a-room side heat exchangers 7A and 7B are open for free passage to a suction pipe 11. And outdoor side change-over valve 13C And let 8C be close.

[0012] Then, the refrigerant gas compressed with the compressor 1 goes into the outdoor side heat exchanger 3 through a discharge tube 10 and the outdoor side change-over valve 18, by radiating heat in the open air ventilated by the outdoor side blower 16 here, is condensate-ized and serves a liquid cooling intermediation. Subsequently, this liquid cooling intermediation passes the outdoor side diaphragm device 4 considered as full open, and goes into a receiver 5, and gas constituents are separated here.

[0013] The liquid cooling intermediation which flowed out of the receiver 5 is the liquid cooling intermediation piping 12, connection refrigerant piping 14A, and 14B. It passes and goes into the interior-of-a-room side diaphragm devices 6A and 6B, and by being extracted here, adiabatic expansion is carried out and it becomes a vapor-liquid two phase. The refrigerant of this vapor-liquid two phase goes into the interior-of-a-room side heat exchangers 7A and 7B, and carries out evaporation evaporation by cooling the indoor air ventilated here by the interior-of-a-room side blowers 9A and 9B. This gas refrigerant is inhaled by the compressor 1 through connection refrigerant piping 15A, 15B, the interior-of-a-room side change-over valves 8A and 8B, branching suction-pipe 11A, 11B, a suction pipe 11, and an accumulator 17.

[0014] When heating operation and indoor unit C are stopped in indoor units A and B when heating operation of all or some of indoor units A, B, and C is carried out for example, the outdoor side diaphragm device 4 and the interior-of-a-room side diaphragm devices 6A and 6B are made into the opening defined beforehand, and let interior-of-a-room side diaphragm device 6C be a close by-pass bulb completely. And the outdoor side change-over valve 18 and the interior-of-a-room side change-over valves 8A, 8B, 8C, and 13C Close, the outdoor side change-over valve 2, interior-of-a-room side change-over valve 13A, and 13B It considers as open.

[0015] The refrigerant breathed out from the compressor 1 in this way A discharge tube 10 and branching discharge-tube 10A, 10B, interior-of-a-room side change-over valve 13A, 13B, and connection refrigerant piping 15A, 15B It passes and condensate-izes by the interior-of-a-room side heat exchangers 7A and 7B, and after being extracted by the interior-of-a-room side diaphragm devices 6A and 6B, adiabatic expansion is carried out by the outdoor side diaphragm device 4 through connection refrigerant piping 14A, 14B, the liquid cooling intermediation piping 12 and a receiver 5. Subsequently, after carrying out evaporation evaporation by the outdoor side heat exchanger 3, it returns to a compressor 1 at this order through the outdoor side change-over valve 2, a suction pipe 11, and an accumulator 17.

[0016] When the number of the indoor units by which heating operation is carried out with the number of the indoor units by which air conditioning operation is carried out at the time of the cold and heating parallel running is equal, indoor unit C is made into the opening as which the outdoor side diaphragm device 4 and the interior-of-a-room side diaphragm devices 6A and 6C were beforehand determined when heating operation and indoor unit B were stopped for air conditioning operation and indoor unit A, and let interior-of-a-room side diaphragm device 6B be a close by-

pass bulb completely. And interior-of-a-room side change-over valve 13A and 8C are open; the outdoor side change-over valves 2 and 18, the interior-of-a-room side change-over valves 8A, 8B and 13B, and 13C. It considers as close.

[0017] In this way, the refrigerant breathed out from the compressor 1 returns to a compressor 1 at this order through a discharge tube 10, branching discharge-tube 10A, interior-of-a-room side change-over valve 13A, connection refrigerant piping 15A, interior-of-a-room side heat exchanger 7A, the interior-of-a-room side diaphragm devices 6A and 6C, interior-of-a-room side heat exchanger 7C, connection refrigerant piping 15C, interior-of-a-room side change-over valve 8C, branching suction-pipe 11C, a suction pipe 11, and an accumulator 17.

[0018] When there are more indoor units by which air conditioning operation is carried out at the time of the cold and heating parallel running than the number of the indoor units by which heating operation is carried out, let the outdoor side diaphragm device 4 and the interior-of-a-room side diaphragm devices 6A, 6B, and 6C be the opening as which indoor units B and C were beforehand determined when heating operation of air conditioning operation and the indoor unit A was carried out. And the outdoor side change-over valve 18 and interior-of-a-room side change-over valve 13A, and 8B and 8C are open, the outdoor side change-over valve 2, the interior-of-a-room side change-over valves 8A and 13B, and 13C. It considers as close.

[0019] The refrigerant breathed out from the compressor 1 branches with a discharge tube 10 in this way, and the part goes into the liquid cooling intermediation piping 12 through the outdoor side change-over valve 18, the outdoor side heat exchanger 3, the outdoor side diaphragm device 4, and a receiver 5. The remainder is branching discharge-tube 10A, interior-of-a-room side change-over valve 13A, connection refrigerant piping 15A, interior-of-a-room side heat exchanger 7A, interior-of-a-room side diaphragm device 6A, and connection refrigerant piping 14A. It passes, and goes into the liquid cooling intermediation piping 12, and the refrigerant which branched previously is joined. Subsequently, this refrigerant returns to a compressor 1 at this order through connection refrigerant piping 14B, 14C, the interior-of-a-room side diaphragm devices 6B and 6C, the interior-of-a-room side heat exchangers 7B and 7C, connection refrigerant piping 15B, 15C, the interior-of-a-room side change-over valves 8B and 8C, branching suction-pipe 11B, 11C, a suction pipe 11, and an accumulator 17.

[0020] If heating operation and indoor unit C suspend [ indoor units A and B ] operation of indoor unit A during air conditioning operation when suspending operation of the indoor unit under heating operation at the time of the cold and heating parallel running for example, interior-of-a-room side blower 9 of indoor unit A stops, and it is interior-of-a-room side change-over valve 13A. It considers as close. and interior-of-a-room side change-over valve 13A made close from -- in order to prevent that the revealed gas refrigerant enters in interior-of-a-room side heat exchanger 7A, liquefies here, and collects into this, opening of interior-of-a-room side diaphragm device 6A is made into the minimum.

[0021]

[Problem(s) to be Solved by the Invention] Since it is open in the above-mentioned conventional a conditioner in the above-mentioned instantiation although interior-of-a-room side diaphragm device 6 of indoor unit A is slight when operation of the indoor unit under heating operation is suspended at the time of its cold and heating parallel running namely, interior-of-a-room side change-over valve 13A from, since the refrigerant gas which was revealed and entered in interior-of-a-room side heat exchanger 7A goes into the liquid cooling intermediation piping 12 through interior-of-a-room side diaphragm device 6A, is followed on the liquid cooling intermediation which \*\*\*\* the inside of this and flows into indoor unit C under air conditioning operation There was a problem that the cooling capacity of indoor unit C will decline.

[0022]

[Means for Solving the Problem] The place which it is invented in order that this invention may solve the above-mentioned technical problem, and is made into the summary of the 1st invention A compressor, the discharge tube connected to the discharge side of this compressor, and the suction pipe connected to the above-mentioned compressor's intake side, An outdoor side heat exchanger and the outdoor side change-over valve which makes the above-mentioned discharge tube or the above-mentioned suction pipe open alternatively the gas side of the above-mentioned outdoor side heat exchanger for free passage, The outdoor side diaphragm device arranged in the liquid side of the above-mentioned outdoor side heat exchanger, and two or more interior-of-a-

room side heat exchangers, The interior-of-a-room side change-over valve which makes the above-mentioned discharge tube or the above-mentioned suction pipe open alternatively the gas side of two or more above-mentioned interior-of-a-room side heat exchangers for free passage, respectively, The interior-of-a-room side diaphragm device arranged in the liquid side of two or more above-mentioned interior-of-a-room side heat exchangers, respectively, Have liquid cooling intermediation piping which connects the liquid side of two or more above-mentioned interior-of-a-room side diaphragm devices the liquid side of the above-mentioned outdoor side diaphragm device, and it sets to air conditioning operation, heating operation, and the air conditioner that can carry out the cold and heating parallel running. While preparing the 1st solenoid valve and capillary tube in the by-path pipe connected to juxtaposition to the interior-of-a-room side change-over valve infixed in the branching suction pipe which connects the above-mentioned interior-of-a-room side heat exchanger and the above-mentioned suction pipe, the 2nd solenoid valve is formed in the liquid side of the above-mentioned interior-of-a-room side diaphragm device. And it is in the air conditioner characterized by establishing the control means which makes the 1st solenoid valve of the above open, and makes the 2nd solenoid valve of the above close by the heating stop mode at the time of the cold and heating parallel running.

[0023] The discharge tube by which the place made into the summary of the 2nd invention was connected to the discharge side of a compressor and this compressor, The suction pipe connected to the above-mentioned compressor's intake side, an outdoor side heat exchanger, and the outdoor side change-over valve which makes the above-mentioned discharge tube or the above-mentioned suction pipe open alternatively the gas side of the above-mentioned outdoor side heat exchanger for free passage, The outdoor side diaphragm device arranged in the liquid side of the above-mentioned outdoor side heat exchanger, and two or more interior-of-a-room side heat exchangers The interior-of-a-room side change-over valve which makes the above-mentioned discharge tube or the above-mentioned suction pipe open alternatively the gas side of two or more above-



## \* NOTICES \*

JPO and NCIPi are not responsible for any damages caused by the use of this translation.

1.This document has been translated by computer. So the translation may not reflect the original precisely.

2.\*\*\*\* shows the word which can not be translated.

3.In the drawings, any words are not translated.

---

TECHNICAL FIELD

---

[Industrial Application] This invention is equipped with two or more sets of one set of an outdoor unit, and indoor units, and relates to the air conditioner which can carry out heating air conditioning operation and operation, and the cold and heating parallel running.

---

[Translation done.]

## \* NOTICES \*

JPO and NCIPi are not responsible for any damages caused by the use of this translation.

1. This document has been translated by computer. So the translation may not reflect the original precisely.

2. \*\*\*\* shows the word which can not be translated.

3. In the drawings, any words are not translated.

---

## PRIOR ART

---

[Description of the Prior Art] One example of this conventional seed air conditioner is shown in drawing 2. In drawing 2, 1 is a compressor, 10 is a discharge tube, and it connects with the discharge side of a compressor 1. 11 is a suction pipe and is connected to the inlet side of a compressor 1. 3 is an outdoor side heat exchanger and the gas side is alternatively connected to a discharge tube 10 or a suction pipe 11 through the outdoor side change-over valves 18 and 2.

[0003] 7A, 7B, and 7C are interior-of-a-room side heat exchangers, and the gas side is branching discharge-tube 10A, and 10B and 10C, respectively. Infixd interior-of-a-room side change-over valve 13A, 13B, and 13C It minds or they are the branching suction pipes 11A and 11B and 11C. It connects with a discharge tube 10 or a suction pipe 11 alternatively through the infixd interior-of-a-room side change-over valves 8A, 8B, and 8C.

[0004] 4 is an outdoor side diaphragm device and is arranged in the liquid side of the outdoor side heat exchanger 3. 6A, 6B, and 6C are interior-of-a-room side diaphragm devices, and are arranged in the liquid side of the interior-of-a-room side heat exchangers 7A, 7B, and 7C, respectively. 12 is liquid cooling intermediation piping and has connected the liquid side of two or more interior-of-a-room side diaphragm devices 6A, 6B, and 6C the liquid side of the outdoor side diaphragm device 4.

[0005] 16 is an outdoor side blower and is made to \*\*\*\* the open air to the outdoor side heat exchanger 3. 9A, 9B, and 9C are interior-of-a-room side blowers, and are made to \*\*\*\* indoor air to the interior-of-a-room side heat exchangers 7A, 7B, and 7C. 5 is a receiver and is infixd in the liquid cooling intermediation piping 12. 17 is an accumulator and is infixd in the inlet side of a compressor 1.

[0006] O is an outdoor unit and a compressor 1, the outdoor side change-over valves 18 and 2, the outdoor side heat exchanger 3, the outdoor side blower 16, the outdoor side diaphragm device 4, the receiver 5, and the accumulator 17 grade are built in in this.

[0007] A, B, and C are indoor units, respectively, interior-of-a-room side heat exchanger 7A, interior-of-a-room side diaphragm device 6A, and interior-of-a-room side blower 9A are built in indoor unit A, interior-of-a-room side heat exchanger 7B, interior-of-a-room side diaphragm device 6B, and interior-of-a-room side blower 9B are built in indoor unit B, and interior-of-a-room side heat exchanger 7C, interior-of-a-room side diaphragm device 6C, and interior-of-a-room side blower 9C are built in indoor unit C.

[0008] S is a branching unit and is branching discharge-tube 10A, 10B, 10C, and branching suction-pipe 11A, 11B, 11C, and interior-of-a-room side change-over valve 13A, 13B, and 13C in this. And 8A, 8B, and 8C are built in.

[0009] For outdoor unit O and the branching unit S, it connects mutually through a discharge tube 10, a suction pipe 11, and the liquid cooling intermediation piping 12, and two or more sets of the branching unit S and indoor units A, B, and C are connection refrigerant piping 14A, 14B, 14C, 15A, 15B, and 15C. It minds and connects.

[0010] And outdoor unit O and indoor units A, B, and C are connected through a control signal line. Moreover, the branching unit S and indoor units A, B, and C are connected through a control signal line. It responds to the operation mode and the load of each indoor units A, B, and C which are transmitted through these control signal line. The outdoor side change-over valves 2 and 18, interior-of-a-room side change-over valve 8A, 8B, 8C, 13A, 13B, 13C, the outdoor side diaphragm device 4, and the interior-of-a-room side diaphragm devices 6A, 6B, and 6C are opened and

closed, and the airflow of the outdoor side blower 16 and the interior-of-a-room side blowers 9A, 9B, and 9C is adjusted.

[0011] When air conditioning operation of all or some of indoor units A, B, and C is carried out, indoor units A and B are made into the opening as which the outdoor side diaphragm device 4 was considered as full open when air conditioning operation and indoor unit C were stopped, and the interior-of-a-room side diaphragm devices 6A and 6B were determined beforehand, and let interior-of-a-room side diaphragm device 6C be a close by-pass bulb completely. And the outdoor side change-over valve 18 opens the outdoor side heat exchanger 3 for free passage to a discharge tube 10, open and the outdoor side change-over valve 2 being used as close. The interior-of-a-room side change-over valves 8A and 8B are open and interior-of-a-room side change-over valve 13A and 13B. Considering as close, the interior-of-a-room side heat exchangers 7A and 7B are open for free passage to a suction pipe 11. And outdoor side change-over valve 13C And let 8C be close.

[0012] Then, the refrigerant gas compressed with the compressor 1 goes into the outdoor side heat exchanger 3 through a discharge tube 10 and the outdoor side change-over valve 18, by radiating heat in the open air ventilated by the outdoor side blower 16 here, is condensate-ized and serves as liquid cooling intermediation. Subsequently, this liquid cooling intermediation passes the outdoor side diaphragm device 4 considered as full open, and goes into a receiver 5, and gas constituents are separated here.

[0013] The liquid cooling intermediation which flowed out of the receiver 5 is the liquid cooling intermediation piping 12, connection refrigerant piping 14A, and 14B. It passes and goes into the interior-of-a-room side diaphragm devices 6A and 6B, and by being extracted here, adiabatic expansion is carried out and it becomes a vapor-liquid two phase. The refrigerant of this vapor-liquid two phase goes into the interior-of-a-room side heat exchangers 7A and 7B, and carries out evaporation evaporation by cooling the indoor air ventilated here by the interior-of-a-room side blowers 9A and 9B. This gas refrigerant is inhaled by the compressor 1 through connection refrigerant piping 15A, 15B, the interior-of-a-room side change-over valves 8A and 8B, branching suction-pipe 11A, 11B, a suction pipe 11, and an accumulator 17.

[0014] When heating operation and indoor unit C are stopped in indoor units A and B when heating operation of all or some of indoor units A, B, and C is carried out for example, the outdoor side diaphragm device 4 and the interior-of-a-room side diaphragm devices 6A and 6B are made into the opening defined beforehand, and let interior-of-a-room side diaphragm device 6C be a close by-pass bulb completely. And the outdoor side change-over valve 18 and the interior-of-a-room side change-over valves 8A, 8B, 8C, and 13C Close, the outdoor side change-over valve 2, interior-of-a-room side change-over valve 13A, and 13B It considers as open.

[0015] The refrigerant breathed out from the compressor 1 in this way A discharge tube 10 and branching discharge-tube 10A, 10B, interior-of-a-room side change-over valve 13A, 13B, and connection refrigerant piping 15A, 15B It passes and condensate-izes by the interior-of-a-room side heat exchangers 7A and 7B, and after being extracted by the interior-of-a-room side diaphragm devices 6A and 6B, adiabatic expansion is carried out by the outdoor side diaphragm device 4 through connection refrigerant piping 14A, 14B, the liquid cooling intermediation piping 12, and a receiver 5. Subsequently, after carrying out evaporation evaporation by the outdoor side heat exchanger 3, it returns to a compressor 1 at this order through the outdoor side change-over valve 2; a suction pipe 11, and an accumulator 17.

[0016] When the number of the indoor units by which heating operation is carried out with the number of the indoor units by which air conditioning operation is carried out at the time of the cold and heating parallel running is equal, indoor unit C is made into the opening as which the outdoor side diaphragm device 4 and the interior-of-a-room side diaphragm devices 6A and 6C were beforehand determined when heating operation and indoor unit B were stopped for air conditioning operation and indoor unit A, and let interior-of-a-room side diaphragm device 6B be a close by-pass bulb completely. And interior-of-a-room side change-over valve 13A and 8C are open, the outdoor side change-over valves 2 and 18, the interior-of-a-room side change-over valves 8A, 8B, and 13B, and 13C. It considers as close.

[0017] In this way, the refrigerant breathed out from the compressor 1 returns to a compressor 1 at this order through a discharge tube 10, branching discharge-tube 10A, interior-of-a-room side change-over valve 13A, connection refrigerant piping 15A, interior-of-a-room side heat exchanger

7A, the interior-of-a-room side diaphragm devices 6A and 6C, interior-of-a-room side heat exchanger 7C, connection refrigerant piping 15C, interior-of-a-room side change-over valve 8C, branching suction-pipe 11C, a suction pipe 11, and an accumulator 17.

[0018] When there are more indoor units by which air conditioning operation is carried out at the time of the cold and heating parallel running than the number of the indoor units by which heating operation is carried out, let the outdoor side diaphragm device 4 and the interior-of-a-room side diaphragm devices 6A, 6B, and 6C be the opening as which indoor units B and C were beforehand determined when heating operation of air conditioning operation and the indoor unit A was carried out. And the outdoor side change-over valve 18 and interior-of-a-room side change-over valve 13A, and 8B and 8C are open, the outdoor side change-over valve 2, the interior-of-a-room side change-over valves 8A and 13B, and 13C. It considers as close.

[0019] The refrigerant breathed out from the compressor 1 branches with a discharge tube 10 in this way, and the part goes into the liquid cooling intermediation piping 12 through the outdoor side change-over valve 18, the outdoor side heat exchanger 3, the outdoor side diaphragm device 4, and a receiver 5. The remainder is branching discharge-tube 10A, interior-of-a-room side change-over valve 13A, connection refrigerant piping 15A, interior-of-a-room side heat exchanger 7A, interior-of-a-room side diaphragm device 6A, and connection refrigerant piping 14A. It passes, and goes into the liquid cooling intermediation piping 12, and the refrigerant which branched previously is joined. Subsequently, this refrigerant returns to a compressor 1 at this order through connection refrigerant piping 14B, 14C, the interior-of-a-room side diaphragm devices 6B and 6C, the interior-of-a-room side heat exchangers 7B and 7C, connection refrigerant piping 15B, 15C, the interior-of-a-room side change-over valves 8B and 8C, branching suction-pipe 11B, 11C, a suction pipe 11, and an accumulator 17.

[0020] If heating operation and indoor unit C suspend [ indoor units A and B ] operation of indoor unit A during air conditioning operation when suspending operation of the indoor unit under heating operation at the time of the cold and heating parallel running for example, interior-of-a-room side blower 9 of indoor unit A stops, and it is interior-of-a-room side change-over valve 13A. It considers as close. and interior-of-a-room side change-over valve 13A made close from -- in order to prevent that the revealed gas refrigerant enters in interior-of-a-room side heat exchanger 7A, liquefies here, and collects into this, opening of interior-of-a-room side diaphragm device 6A is made into the minimum.

---

[Translation done.]

## \* NOTICES \*

JPO and NCIP are not responsible for any damages caused by the use of this translation.

1.This document has been translated by computer. So the translation may not reflect the original precisely.

2.\*\*\*\* shows the word which can not be translated.

3.In the drawings, any words are not translated.

---

EFFECT OF THE INVENTION

---

[Effect of the Invention] In this invention, it is the heating stop mode at the time of the cold and heating parallel running, and since the refrigerant gas revealed from the interior-of-a-room side change-over valve since the 1st solenoid valve serves as open and the 2nd solenoid valve served as close is inhaled in a suction pipe through the 1st solenoid valve and capillary tube, this refrigerant gas liquefies within an interior-of-a-room side heat exchanger, and does not collect. Moreover, since this refrigerant gas does not go into liquid cooling intermediation piping through an interior-of-a-room side diaphragm device, the fall of the cooling capacity of the indoor unit under air conditioning operation can be prevented.

---

[Translation done.]

## \* NOTICES \*

JPO and NCIPi are not responsible for any damages caused by the use of this translation.

- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.\*\*\*\* shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

---

TECHNICAL PROBLEM

---

[Problem(s) to be Solved by the Invention] Since it is open in the above-mentioned conventional air conditioner in the above-mentioned instantiation although interior-of-a-room side diaphragm device 6 of indoor unit A is slight when operation of the indoor unit under heating operation is suspended at the time of its cold and heating parallel running namely, interior-of-a-room side change-over valve 13A from, since the refrigerant gas which was revealed and entered in interior-of-a-room side heat exchanger 7A goes into the liquid cooling intermediation piping 12 through interior-of-a-room side diaphragm device 6A, is followed on the liquid cooling intermediation which \*\*\*\* the inside of this and flows into indoor unit C under air conditioning operation There was a problem that the cooling capacity of indoor unit C will decline.

---

[Translation done.]

## \* NOTICES \*

JPO and NCIP are not responsible for any damages caused by the use of this translation.

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

---

MEANS

---

[Means for Solving the Problem] The place which it is invented in order that this invention may solve the above-mentioned technical problem, and is made into the summary of the 1st invention A compressor, the discharge tube connected to the discharge side of this compressor, and the suction pipe connected to the above-mentioned compressor's intake side, An outdoor side heat exchanger and the outdoor side change-over valve which makes the above-mentioned discharge tube or the above-mentioned suction pipe open alternatively the gas side of the above-mentioned outdoor side heat exchanger for free passage, The outdoor side diaphragm device arranged in the liquid side of the above-mentioned outdoor side heat exchanger, and two or more interior-of-a-room side heat exchangers, The interior-of-a-room side change-over valve which makes the above-mentioned discharge tube or the above-mentioned suction pipe open alternatively the gas side of two or more above-mentioned interior-of-a-room side heat exchangers for free passage, respectively, The interior-of-a-room side diaphragm device arranged in the liquid side of two or more above-mentioned interior-of-a-room side heat exchangers, respectively, Have liquid cooling intermediation piping which connects the liquid side of two or more above-mentioned interior-of-a-room side diaphragm devices the liquid side of the above-mentioned outdoor side diaphragm device, and it sets to air conditioning operation, heating operation, and the air conditioner that can carry out the cold and heating parallel running. While preparing the 1st solenoid valve and capillary tube in the by-path pipe connected to juxtaposition to the interior-of-a-room side change-over valve infixed in the branching suction pipe which connects the above-mentioned interior-of-a-room side heat exchanger and the above-mentioned suction pipe, the 2nd solenoid valve is formed in the liquid side of the above-mentioned interior-of-a-room side diaphragm device. And it is in the air conditioner characterized by establishing the control means which makes the 1st solenoid valve of the above open, and makes the 2nd solenoid valve of the above close by the heating stop mode at the time of the cold and heating parallel running.

[0023] The discharge tube by which the place made into the summary of the 2nd invention was connected to the discharge side of a compressor and this compressor, The suction pipe connected to the above-mentioned compressor's intake side, an outdoor side heat exchanger, and the outdoor side change-over valve which makes the above-mentioned discharge tube or the above-mentioned suction pipe open alternatively the gas side of the above-mentioned outdoor side heat exchanger for free passage, The outdoor side diaphragm device arranged in the liquid side of the above-mentioned outdoor side heat exchanger, and two or more interior-of-a-room side heat exchangers, The interior-of-a-room side change-over valve which makes the above-mentioned discharge tube or the above-mentioned suction pipe open alternatively the gas side of two or more above-mentioned interior-of-a-room side heat exchangers for free passage, respectively, The interior-of-a-room side diaphragm device arranged in the liquid side of two or more above-mentioned interior-of-a-room side heat exchangers, respectively, Have liquid cooling intermediation piping which connects the liquid side of two or more above-mentioned interior-of-a-room side diaphragm devices the liquid side of the above-mentioned outdoor side diaphragm device, and it sets to air conditioning operation, heating operation, and the air conditioner that can carry out the cold and heating parallel running. While forming the 2nd solenoid valve in the liquid side of the above-mentioned interior-of-a-room side diaphragm device, the 1st solenoid valve and capillary tube are prepared in the bypass circuit which connects the above-mentioned suction pipe between this 2nd solenoid valve and the above-mentioned interior-of-a-room side diaphragm devices. And it is in

the air conditioner characterized by establishing the control means which makes the 1st solenoid valve of the above open, and makes the 2nd solenoid valve of the above close by the heating stop mode at the time of the cold and heating parallel running.

---

[Translation done.]



## \* NOTICES \*

JPO and NCIPi are not responsible for any damages caused by the use of this translation.

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

---

OPERATION

---

[Function] In this invention, it is the heating stop mode at the time of the cold and heating parallel running, and since the 1st solenoid valve serves as open, the refrigerant gas revealed from the interior-of-a-room side change-over valve made close is inhaled in a suction pipe through the 1st solenoid valve and capillary tube which were prepared in a by-path pipe and this. Therefore, this refrigerant gas liquefies within an interior-of-a-room side heat exchanger, and does not collect. Moreover, since the 2nd solenoid valve serves as close, this refrigerant gas does not go into liquid cooling intermediation piping through an interior-of-a-room side heat exchanger and an interior-of-a-room side diaphragm device.

---

[Translation done.]

## \* NOTICES \*

JPO and NCIP are not responsible for any damages caused by the use of this translation.

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

## EXAMPLE

[Example] The 1st example of this invention is shown in drawing 1. Branching suction-pipe 11A which connects the interior-of-a-room side heat exchangers 7A, 7B, and 7C and suction pipe 11 of each indoor units A, B, and C, 11B and 11C As opposed to the infixed interior-of-a-room side change-over valves 8A, 8B, and 8C to juxtaposition By-path pipe 20A, 20B and 20C it connects -- having -- these by-path pipe 20A, 20B, and 20C \*\*\*\* -- respectively -- the 1st solenoid-valve 21A, 21B, and 21C And capillary tube 22A, 22B, and 22C It is infixed. Moreover, interior-of-a-room side change-over valve 13A, 13B, and 13C It receives and they are capillary tube 24A, 24B, and 24C to juxtaposition. It is infixed. And in the liquid side of each interior-of-a-room side diaphragm devices 6A, 6B, and 6C, they are the 2nd solenoid-valve 23A, 23B, and 23C, respectively. It is infixed.

[0026] Moreover, the 1st solenoid-valve 21A of the indoor unit which carried out a heating halt when it considered as heating stop mode at the time of the cold and heating parallel running, 21B, and 21C They are the 2nd solenoid valve 23A and 23B and 23C at the same time it considers as open. Control means made close (not shown) It is prepared.

[0027] The relation between the operation mode of \*\* and indoor units A, B, and C and closing motion of the interior-of-a-room side change-over valves 13 and 8, the 1st solenoid valve 21, the 2nd solenoid valve 23, and the interior-of-a-room side diaphragm device 6 is [Table 1].

運転 モード	室内側切 換弁 13	室内側切 換弁 8	第 1 の電 磁弁 21	第 2 の電 磁弁 23	室内側絞 り機構 6
冷房	閉	開	閉	開	開
冷房停止	閉	閉	開	閉	閉
暖房	開	閉	閉	開	開
暖房停止	閉	閉	開	閉	小開

It is alike and is shown.

[0028]

[Table 1]

[0029] Other configurations are the same as that of the conventional thing shown in drawing 2, and the same sign is given to the corresponding member.

[0030] When the deer was carried out and the indoor unit under heating operation is suspended at the time of the cold and heating parallel running, For example, if the signal of a purport with which heating operation and indoor unit C suspend [ indoor units A and B ] heating operation of indoor unit A under heating operation during air conditioning operation is inputted like the above-mentioned instantiation Interior-of-a-room side blower 9 of indoor unit A A stops by the command from the control means which is not illustrated, and it is interior-of-a-room side change-over valve

13A. While the opening of close and outdoor side diaphragm device 6A serves as the minimum, it is the 1st solenoid-valve 21A. Open and the 2nd solenoid-valve 23A It becomes close.

[0031] interior-of-a-room side change-over valve 13A by which the refrigerant gas in a discharge tube 10 was made in this way branching discharge-tube 10A and close from -- revealing -- connection refrigerant piping 15A Although it is going to pass and is going to enter in interior-of-a-room side heat exchanger 7A The 1st solenoid-valve 21A Since it has open, this refrigerant gas is by-path pipe 20A, capillary tube 22A, the 1st solenoid-valve 21A, and branch pipe suction-pipe 11A. It passes and is inhaled in a suction pipe 11. Therefore, the revealed refrigerant gas enters in interior-of-a-room side heat exchanger 7A, liquefies here, and does not collect into this.

[0032] Moreover, even when the revealed refrigerant gas enters in interior-of-a-room side heat exchanger 7A, it is the 2nd solenoid-valve 23A. Although interior-of-a-room side diaphragm device 6A is slightly open since it has close, the gas refrigerant which entered in interior-of-a-room side heat exchanger 7A does not go into the liquid cooling intermediation piping 12 through interior-of-a-room side diaphragm device 6A like before. Therefore, since a refrigerant gas is followed on the liquid cooling intermediation which flows the liquid cooling intermediation piping 12 and does not flow into indoor unit C under air conditioning operation like the conventional thing, cooling capacity of indoor unit C is not reduced.

[0033] In addition, at the time of air conditioning operation of indoor unit A, interior-of-a-room side change-over valve 8A, the 2nd solenoid-valve 23A, and interior-of-a-room side diaphragm device 6A are open and interior-of-a-room side change-over valve 13A and the 1st solenoid-valve 21A. Since it has close The liquid cooling intermediation in the liquid cooling intermediation piping 12 goes into a suction pipe 11 at this order through connection refrigerant piping 14A, the 2nd solenoid-valve 23A, interior-of-a-room side diaphragm device 6A, interior-of-a-room side heat exchanger 7A, connection refrigerant piping 15A, branching suction-pipe 11A, and interior-of-a-room side change-over valve 8A. During-this-period and branching discharge-tube 10A An inner refrigerant is capillary tube 24A. It passes and is small [ every ] branching suction-pipe 11A. Since it is inhaled, it is branching suction-pipe 11A. And it can prevent the refrigerant gas in a discharge tube 10 liquefying, and collecting into this.

[0034] Moreover, when operation of indoor unit A under the cold and heating parallel running, and air conditioning operation is suspended by the command from remote control, although a halt, the 2nd solenoid-valve 23A, interior-of-a-room side change-over valve 13A, 8A, and interior-of-a-room side diaphragm device 6A become close, interior-of-a-room side blower 9A The 1st solenoid-valve 21A Since it becomes open, the 2nd solenoid-valve 23A and interior-of-a-room side change-over valve 13A, The refrigerant which was revealed from 8A and interior-of-a-room side diaphragm device 6A, and entered in interior-of-a-room side heat exchanger 7A is the 1st solenoid-valve 21A. Since it passes and is drawn in by the suction pipe 11, it can prevent that a refrigerant collects in interior-of-a-room side heat exchanger 7A.

[0035] The 2nd example of this invention is shown in drawing 3 . To the liquid side of each interior-of-a-room side diaphragm devices 6A, 6B, and 6C, the 2nd solenoid-valve 23A, 23B and 23C It is prepared. This 2nd solenoid-valve 23A and 23B, 23C Bypass circuit 24A by which the end was connected among the interior-of-a-room side diaphragm devices 6A, 6B, and 6C, and the other end was connected with the suction pipe 11, 24B, and 24C The 1st solenoid-valve 21A, 21B, and 21C Capillary tube 22A, 22B, and 22C It is infixed.

[0036] And they are the 1st solenoid-valve 21A, 21B, and 21C by the command from the control means which is not illustrated when it considers as heating stop mode at the time of the cold and heating parallel running. They are the 2nd solenoid-valve 23A, 23B, and 23C at the same time it considers as open. It considers as close.

[0037] In addition, 2nd solenoid-valve 23A, 23B, 23C, 1st solenoid-valve 21A, 21B, 21C, and capillary tube 22A, 22B, and 22C It is contained in the branching unit S. Other configurations are the same as that of the conventional thing shown in drawing 2 , and the same sign is given to the corresponding member.

[0038] When the deer was carried out and heating operation of the indoor unit under heating operation is suspended at the time of the cold and heating parallel running, For example, heating operation and indoor unit C like the above-mentioned instantiation If the signal of a purport which suspends operation of indoor unit A under heating operation during air conditioning operation is inputted, [ indoor units A and B ] Interior-of-a-room side blower 9of indoor unit A A stops by the

command from the control means which is not illustrated, and it is interior-of-a-room side change-over valve 13A. While the opening of close and outdoor side diaphragm device 6A serves as the minimum, it is the 1st solenoid-valve 21A. Open and the 2nd solenoid-valve 23A It becomes close. [0039] interior-of-a-room side change-over valve 13A from -- the revealed gas refrigerant -- connection refrigerant piping 15A although it is going to pass and is going to enter in interior-of-a-room side heat exchanger 7A -- the 1st solenoid-valve 21A since it has open -- this refrigerant gas -- bypass circuit 24A, the 1st solenoid-valve 21A, and capillary tube 22A It passes and is inhaled in a suction pipe 11. Therefore, a refrigerant gas enters in interior-of-a-room side heat exchanger 7A, and it liquefies here, and does not collect into this.

[0040] Moreover, even if the revealed gas refrigerant enters in interior-of-a-room side heat exchanger 7A, it is the 2nd solenoid-valve 23A. Although interior-of-a-room side diaphragm device 6A is slightly open since it has close, the gas refrigerant which entered in interior-of-a-room side heat exchanger 7A does not go into the liquid cooling intermediation piping 12 through interior-of-a-room side diaphragm device 6A like before. Therefore, since a refrigerant gas is followed on the liquid cooling intermediation which flows the liquid cooling intermediation piping 12 and does not flow into indoor unit C under air conditioning operation like the conventional thing, cooling capacity of indoor unit C is not reduced.

[0041] In addition, at the time of air conditioning operation of indoor unit A, interior-of-a-room side change-over valve 8A, the 2nd solenoid-valve 23A, and interior-of-a-room side diaphragm device 6A are open and interior-of-a-room side change-over valve 13A and the 1st solenoid-valve 21A. Since it has close The liquid cooling intermediation in the liquid cooling intermediation piping 12 goes into a suction pipe 11 at this order through the 2nd solenoid-valve 23A, connection refrigerant piping 14A, interior-of-a-room side diaphragm device 6A, interior-of-a-room side heat exchanger 7A, connection refrigerant piping 15A, branching suction-pipe 11A, and interior-of-a-room side change-over valve 8A.

[0042] Moreover, when operation of indoor unit A under the cold and heating parallel running, and air conditioning operation is suspended, although a halt, the 2nd solenoid-valve 23A, interior-of-a-room side change-over valve 13A, 8A, and interior-of-a-room side diaphragm device 6A become close, interior-of-a-room side blower 9A The 1st solenoid-valve 21A Since it becomes open, the 2nd solenoid-valve 23A and interior-of-a-room side change-over valve 13A, The refrigerant which was revealed from 8A and interior-of-a-room side diaphragm device 6A, and entered in interior-of-a-room side heat-exchanger 7A is bypass circuit 24A and the 1st solenoid-valve 21A. And capillary tube 22A Since it passes and is drawn in by the suction pipe 11, it can prevent that a refrigerant collects in interior-of-a-room side heat-exchanger 7A.

---

[Translation done.]

\* NOTICES \*

JPO and NCIP are not responsible for any damages caused by the use of this translation.

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

---

DESCRIPTION OF DRAWINGS

---

[Brief Description of the Drawings]

[Drawing 1] It is the refrigerant circuit Fig. showing the 1st example of this invention.

[Drawing 2] It is the refrigerant circuit Fig. of the conventional air conditioner.

[Drawing 3] It is the refrigerant circuit Fig. showing the 2nd example of this invention.

[Description of Notations]

1 Compressor

10 Discharge Tube

11 Suction Pipe

O Outdoor unit

3 Outdoor Side Heat Exchanger

A, B, C Indoor unit

7A, 7B, 7C Interior-of-a-room side heat exchanger

12 Liquid Cooling Intermediation Piping

2 18 Outdoor side change-over valve

8A, 8B, 8C, 13A, 13B, and 13C Interior-of-a-room side change-over valve

4 Outdoor Side Diaphragm Device

6A, 6B, 6C Interior-of-a-room side diaphragm device

11A 11B and 11C Branching suction pipe

20A 20B and 20C By-path pipe

21A 21B and 21C The 1st solenoid valve

22A 22B and 22C Capillary tube

23A 23B and 23C The 2nd solenoid valve

---

[Translation done.]